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Fighting the War above Iraq
Employing Space Forces
to Defeat an Insurgency

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Foreword

Welcome to another in our series called “The Wright Flyer Papers.” The Air Command and Staff College (ACSC) is pleased to publish our best student research projects each academic year. Our research program is designed to encourage our students to explore topics and issues aimed at advancing the application of air and space power and understanding the profession of arms. To that end, this series reflects our desire to perpetuate the intellectual spirit of early military aviation pioneers who availed themselves of time, here at Maxwell, to reflect solid research, innovative thought, and lucid preparation. Put another way, we think they are worth your time to read.

The Wright Flyer Papers reflect an eclectic range of doctrinal, technological, organizational, and institutional issues. Some research provides new solutions to familiar problems. Other studies highlight new opportunities and the benefits of their pursuit. By making these research studies available through the Wright Flyer Papers, ACSC intends to foster continued conversation amongst Airmen and fellow members of the profession of arms . . . a conversation that has helped create the most capable fighting force the world has ever known.



JAY H. LINDELL
Brigadier General, USAF
Commandant



Preface

Inherently, a project of this magnitude is more than the work of one person. Research often includes ideas and input from many individuals, and this paper is no exception. To begin, I would like to thank my advisor, Lt Col Jerry Brumfield. His guidance and wisdom on the research and level of effort required for this project were critical to its successful completion.

I would also like to thank two additional Air University instructors. First, I would like to express my appreciation to Dr. William T. Dean III, Air Command and Staff College faculty. His ideas on the threads common to insurgencies proved crucial in understanding the ways to counter them. Additionally, I would like to convey my deepest gratitude for the assistance of Col Robyn S. Read, USAF, retired, College of Aerospace Doctrine, Research and Education faculty. His knowledge of this subject area was invaluable in refining my initial attempts to grapple with this problem and guiding me towards previous research that validated them.

Next, I need to thank my fellow Joint Spacemindedness Research Seminar classmates. Maj Brian S. Sandlin and Maj Fred D. Taylor both provided critical advice on the formative ideas behind this paper. Furthermore, during the research and writing process, they gave me critical feedback, highlighting many areas of weakness, which were later improved.

Finally, I would like to thank Sherry A. Oldenburg (BS, MS). Although dealing with a subject matter she was highly unfamiliar with, she provided an excellent sounding board and identified numerous areas of “jargon-coated ignorance.” In addition, she gave me the motivation I needed when it was otherwise lacking.

I know I have forgotten many people who deserve mention. The key point I hope the reader appreciates is that the following was a team effort. I am truly grateful for the help others provided me along the way to its completion.





Abstract

The 2002 *National Security Strategy* states that “the struggle against global terrorism . . . will be fought on many fronts.” The front currently receiving the greatest attention is the counterinsurgency effort in Iraq. Given this war’s importance, the US armed forces must use every tool at their disposal to effectively prosecute this campaign. Can space forces be employed to help fight this and other insurgencies?

To answer this question, this paper first validates that fighting insurrections is an enduring requirement and therefore worth expending the effort required to change. Next, a review of space (including near-space) forces’ capabilities is provided for background. Three areas of current need in Iraq are then introduced. In each of these, a discussion of historic attempts to solve similar problems ensues, showing the challenges in Iraq are not unique and providing lessons for future operations. Based upon requirements in Iraq and the historical examples, the capabilities space forces can bring to fight rebellions are then highlighted.

This paper shows that in Operation Iraqi Freedom, and other counterinsurgency operations, space forces will not be “war winners” but can provide crucial support. Specifically, surveillance and reconnaissance capabilities can help isolate the battlespace. These systems can also enhance the ability to combat fielded rebels through surveillance, reconnaissance, and communications. Finally, the effects space forces generate can support the government and help strengthen its ability to solve the insurgents’ cause. The discussion concludes with specific recommendations to improve performance against this and future insurrections.





Introduction

Our mission in Iraq is clear. We're hunting down the terrorists. We're helping Iraqis build a free nation that is an ally in the war on terror. We're advancing freedom in the broader Middle East. We are removing a source of violence and instability, and laying the foundation of peace for our children and grandchildren.

—Pres. George W. Bush (28 June 2003)
National Strategy for Victory in Iraq

One can hardly open a newspaper and not read numerous articles about the current efforts in Iraq. Whether they are providing updates, debating overall strategy, or discussing the operation's future, the counterinsurgency struggle in Iraq is the national and military topic du jour. Given this, it is natural for military members to look for ways to improve their performance in this effort. Moreover, since space forces have become one of the United States' asymmetrical advantages, it is also natural to ask if they could be better used in this fight.

The following discussion explores how the US military can employ space forces to help defeat an insurgency. It starts by showing that change in the approach to our current conflict is, indeed, necessary and provides a background on the capabilities these forces provide. Next, the requirements in Iraq, in light of similar historic events, are examined. These past events not only show that the current fight is not unique but also identify capabilities used to battle against similar struggles. Based on these cases, we can determine ways that space forces can fulfill needs, both now in Iraq and in the future. Finally, specific recommendations that can be implemented are offered. While counterinsurgencies are never clean and quick, they are today's—and likely tomorrow's—fight. It is hoped that these proposals will be carried out in order to improve the US military's effectiveness in prosecuting them.

Counterinsurgency as an Ongoing Struggle

Although operations in Iraq are the current national focus, any recommended changes to the military must not

“fight yesterday’s battle.” Specifically, any proposals must not only defeat today’s threats but also defend against tomorrow’s. To validate a need for change, the discussion begins by proving that Iraq is not the only battle of this type the US military is expected to fight. To do this, let us review the indications from policy documents and directives for future US military actions and the changes required to execute them.

National Security Strategy

Any national policy discussion should begin with the *National Security Strategy (NSS)* since it provides the highest level statement of US policy. Although the 2002 NSS does not specifically identify insurgents as a threat, the importance of fighting terrorism (a common insurgent tactic) receives page-one attention.¹ Specifically, the NSS notes that

defending [the US] against its enemies is the first and fundamental commitment of the Federal Government. Today, that task has changed dramatically. Enemies in the past needed great armies and great industrial capabilities to endanger America. Now, shadowy networks of individuals can bring great chaos and suffering to [America’s] shores for less than it costs to purchase a single tank. Terrorists are organized to penetrate open societies and to turn the power of modern technologies against [Americans].²

In order to defeat these “shadowy networks of individuals,” the NSS notes that the United States “must make use of every tool in [its] arsenal.” Furthermore, once a terrorist threat is localized to a particular state, the United States will “ensure the state has the military, law enforcement, political, and financial tools necessary to finish the task.”³ Since many insurgents utilizing terrorism are localized in Iraq, the highest policy level is mandating that the military use all efforts (including space forces) to defeat this threat. Furthermore, the US military must be prepared to respond with every tool to defeat other insurrections should terrorist rebels localize in a future country of national interest.

National Defense Strategy

The next level of documented policy driving strategic military decisions is the *National Defense Strategy (NDS)*. It groups insurgency with terrorism as an “irregular” chal-

lenge. To counter it, the *NDS* directs the US military to re-orient its “capabilities to contend with such irregular challenges more effectively.” It predicts that “irregular conflict will be a key challenge for the foreseeable future,” which “will involve [US] forces in complex security problems for some time to come.” These conflicts “may require changes to the way [the US] train[s], equip[s], and employ[s] [its] forces, particularly for fighting terrorists and insurgents and conducting stability operations.”⁴ From this, it is apparent that the Department of Defense (DOD) anticipates that struggles against insurgencies will continue and expects the military to change to deal with them.

DOD Directive 3000.05

Moving from the analysis of national strategy to department directives, we continue to see the emphasis on fighting insurrections. Of note, DOD Directive (DODD) 3000.05, *Military Support for Stability, Security, Transition, and Reconstruction Operations*, was signed on 28 November 2005 (in part, many believe, as a reaction to perceived failings in Iraq) to direct changes in the department. It establishes stability operations (defined as “military and civilian activities conducted across the spectrum from peace to conflict to establish or maintain order in States and regions”) as a “core US military mission.”⁵ By definition, counterinsurgency (COIN) operations are a subset of these missions to support order and, therefore, should be treated as a core US military mission.⁶

The statements contained in these three documents underscore the expectation of both US statesmen and Defense Department civilian leadership for the military’s COIN mission to be enduring. Furthermore, they direct military forces to adapt to it. Given the need to change, we can next look towards the overarching capabilities required to win against insurgencies.

Desired Capabilities for Counterinsurgency

After reviewing support for the requirement for change, we now turn to the capabilities necessary to make that change. For this study, the *National Defense Strategy* and

the *National Strategy for Victory in Iraq* were used to identify what was deemed pertinent to the COIN struggle.

National Defense Strategy

The NDS identifies eight “key operational capabilities” as the focus for defense transformation, four of which are germane to the current discussion. The first is the desire to “strengthen intelligence” by increasing military “capabilities for collection.” Within the second goal of “denying enemies sanctuary,” the NDS notes that “to deny sanctuary requires a number of capabilities, including: persistent surveillance . . . and stability operations to assist in the establishment of effective and responsible control over ungoverned territory.” This clarifies the above requirement for intelligence collections by specifying that they should be persistent and work with stability operations to aid territorial control.

Next, under “improving proficiency against irregular challenges,” the NDS elaborates that “working together with other elements of the US Government, allies, and partners (including indigenous actors), [US forces] require the capabilities to identify, locate, track, and engage individual enemies and their networks. Doing so will require greater capabilities across a range of areas, particularly intelligence, surveillance, and communications.” The value of surveillance is once again highlighted as a means to control territory and find and engage enemies, as is the importance of communications.

Finally, within the requirement of “increasing capabilities of partners—international and domestic,” the NDS notes that one of the “military’s most effective tools in prosecuting the Global War on Terrorism is to help train indigenous forces.” Additionally, the DOD “will work with interagency and international partners to improve [its] ability to transition from military- to civilian-led stability operations.”⁷ Thus, besides the previously identified goals of denying sanctuary and engaging irregular enemies, a third critical national defense goal is training and supporting indigenous civil authorities during phase four and five operations. These three requisite capabilities for defense transformation put forth by the NDS clearly translate into key objectives for the war in Iraq, as this paper will substantiate.

National Strategy for Victory in Iraq

The *National Strategy for Victory in Iraq (NSVI)* was published in November 2005 to define the end states for US operations in Iraq and the high-level interagency strategy for achieving those end states. It is built along a three-track approach—the one most clearly involving the military is the security track. This track “involves carrying out a campaign to defeat the terrorists and neutralize the insurgency, developing Iraqi security forces, and helping the Iraqi government clear . . . hold . . . and build.” From this we can conclude that the *NDS*’s calls to “strengthen intelligence,” “improv[e] proficiency against irregular challenges,” and “[deny] enemies sanctuary” will likely be of benefit in this area. The *NSVI* next notes the political track wherein the United States is “working to forge a broadly supported national compact for democratic governance by helping the Iraq government isolate . . . engage . . . and build.” Finally, the economic track “involves setting the foundation for a sound and self-sustaining economy by helping the Iraqi government restore . . . reform . . . and build.”⁸ It is in these other two tracks that the *NDS*’s direction for “increasing capabilities of partners,” specifically improving military to civilian transition, will be crucial. These *NDS*-directed capabilities will be critical to executing the precepts contained in the *NSVI*.

Consequently, COIN operations are vital for the US military, not just in Iraq but into the future. Since three of the attributes contained in the *NDS*—denying sanctuary, attacking enemy forces, and supporting foreign governments—are also required in Iraq, they will provide the framework for validating the role of space forces in COIN. However, first we will look at the capabilities of space forces.

Space Forces and Their Capabilities

Space now provides an improved theater and global perspective of the world for today’s leaders. Also, like early airplane use, early space development primarily focused on reconnaissance and intelligence. Today, space systems are maturing from the equivalent of the reconnaissance biplane in World War I, to becoming a fully integrated part of our Air Force ca-

pability. This capability is the ultimate high ground of US military operations.

—Air Force Doctrine Document (AFDD) 2-2
Space Operations

As noted above, space provides the “ultimate high ground,” but it is easy to ask if this is applicable in fighting an insurgency. To aid our discussion, we now turn to the capabilities that space forces can provide. First, it is important to clarify the term *space forces*. Joint Publication 1-02 notes they include “space and terrestrial systems, equipment, facilities, organizations, and personnel necessary to access, use and, if directed, control space for national security.”⁹ These systems are (as AFDD 2-2 notes) not only military but also national, commercial, civil, and foreign (if the United States is allowed to access them). AFDD 2-2 further defines a space system as one “with a major functional component that operates in the space environment or which, by convention, is so designated.”¹⁰ Although helping, this still creates difficulties as, in theory, any system (if so selected by convention) could be called a space system.

To resolve this issue, this paper follows a modification of the “space effects” paradigm, which focuses on the effects an asset generates and not solely its location.¹¹ Therefore, in our discussion, space systems include those with portions operating in either traditional space (above the atmosphere, subject to the laws of orbital mechanics) or near space (sub-orbital locations from approximately 65,000 to 325,000 feet above the surface).¹² When discussing objects only within one area, the terms *satellites* or *near-space assets* will be used. Finally, since air, near-space, and orbiting forces can generate some similar effects (e.g., wide-area surveillance), the term *above the surface* is used when an asset in any of the three mediums could perform a function. This section begins by reviewing the roles of, and employment considerations for, space forces. Next, it evaluates the proposed concept of Joint Warfighting Space, which is looking to improve the capabilities space forces provide. Finally, a quick analysis of the trade-offs between above-the-surface assets is presented.

Space Forces' Functions and Employment Considerations

Space forces perform many functions which can aid in countering insurrections. AFDD 2-2 notes the most relevant ones as command and control (C2); intelligence, surveillance, and reconnaissance (ISR); navigation and timing; weather services; and support to counterair, counterland, countersea, and special operations. While accomplishing these tasks, space forces provide three important capabilities. First, holding “the ultimate high ground” allows them to provide persistence (through continuous revisits, or permanent presence over any area [even denied areas]) not available through other systems. Additionally, this high ground allows for access to a larger field of view than available through other systems. Finally, the operating altitudes of space forces provide them a relatively unique, secure position.

Although providing distinctive advantages, space forces have their limitations. According to AFDD 2-2, orbiting platforms traditionally lacked the flexibility of other systems. Due to restricted access, the US military has not had the ability to change missions, upgrade or repair systems, or easily change the orbital parameters of satellites. Another drawback is that due to their limited maneuverability, exoatmospheric objects have been hampered by their predictability. Consequently, adversary forces can counter these objects’ capabilities by concealing information when space forces are in view (without greatly hampering overall enemy operations). Additionally, the cost associated with traditional systems has created a requirement to prioritize effects. This requirement has limited the ability of lower military echelons to focus space forces’ efforts where they are needed.¹³ In an attempt to overcome these constraints, the Air Force is pursuing a new concept: Joint Warfighting Space (JWS).

Joint Warfighting Space

JWS is the USAF’s recent attempt to “provide the combatant commander dedicated space/near-space capabilities augmenting strategic space assets to provide effects such as integrated theater-centric [ISR]; battlespace awareness (includes air, land, sea, space, information domains);

robust communications and strike, with a goal of achieving dedicated real time target location, identification, tracking and engagement; and effective C2 of current and future space capabilities.¹⁴ As noted, this concept includes assets in both orbit and near space, with the goal of maintaining space systems' capabilities while minimizing or removing their limitations. Lt Col William Volz points out that it seems apparent that the JWS goal for satellites through 2008 is to exploit existing technologies. Specifically, JWS is focused on improving the joint force commander's (JFC) ability to task current on-orbit systems. Volz says that in the longer term (2009–13), JWS is attempting to provide a quick-reaction force of tactical satellites with organic launch and on-orbit support. He adds that these platforms are currently envisioned to provide a 1,000-pound payload with a minimum one-year service life.¹⁵ Ideally, these systems will improve the JFC's ability to task orbiting platforms by providing dedicated effects, and their quick-turn launches will place satellites in orbits less predictable to the enemy.

The inclusion of near-space systems in JWS will, if successful, also help eliminate many of the space forces' current limitations. In addition to being more responsive than orbiting craft (due to decreased launch preparation times and costs), near-space forces should be able to generate the persistent effects current capabilities cannot. Specifically, near-space assets should be able to provide continuous single-point coverage at ranges much less than orbiting objects.¹⁶ Although still in development, current trials show promise. The University of York has been able to generate a data link of 11 megabytes per second at distances up to 37 miles by placing a balloon at 78,000 feet.¹⁷ Furthermore, the Missile Defense Agency has contracted for an airship that is scheduled to fly a 500-pound communications payload at 55,000 feet by 2009. Ultimately, this program's goal is to fly a 4,000-pound communications and sensor payload for 90–180 days by 2011.¹⁸ Given these other efforts, JWS's goal of fielding first generation near-space assets by 2008 seems fairly realistic.¹⁹ JWS seems promising as a means to allow space forces the ability to generate more beneficial effects to JFCs with fewer limitations.

Trade-Offs between Above-the-Surface Assets

Although the performance of space forces is improving, there will likely always be trade-offs between above-the-surface assets. Previous research has presented some of the considerations for choosing among the various operating locations (table 1).²⁰ While near-space platforms provide the continuous overhead capability of air-breathing assets with (as planned) a lower cost and greater area of visibility, they do have their limitations. First, airships and balloons both require fairly large structures for inflation and are constrained by weather for launch.²¹ Another major limitation is the uncertain legality of their overflight. Although it is yet to be determined whether near-space assets will be guaranteed overflight like satellites, or have their actions limited by national sovereignty like aircraft, the result should not limit their utility in COIN.²² Since the battle against insurrections is waged by a legitimate government, it has the authority to determine overflight rights. Therefore, the ability to fly near-space assets (or air assets for that matter) should not be limited by legal issues, assuming the in-place authorities authorize them.

Table 1. Considerations for satellite, near-space, and air-breathing asset employment

Considerations	Satellite	Near Space (estimate)	Air-Breathing
Cost (to deploy 1,000-pound payload)	\$10–40,000,000 (launch only)	\$1,000,000	\$48,000,000 (to buy 1 Global Hawk)
Persistence (10° above horizon)	4–6 minutes/2 hours (LEO) ^a Continuous (GEO) ^b	Continuous (up to 1 year)	Continuous (up to a few days with 1 aircraft)
Responsiveness	100s of days (current) Hours–days (JWS estimate)	Hours	Hours
Footprint (radius of 10° lookup)	500 miles (LEO) 4,841 miles (GEO)	120 miles	15 miles

Table 1. (continued)

Considerations	Satellite	Near Space (estimate)	Air-Breathing
<i>Resolution</i>	1 x SC ^c (LEO) .0056x SC (GEO)	5.5 x SC	44 x SC
<i>Overflight</i>	Guaranteed	Debatable	Denied
<i>Employment flexibility</i>	Limited	Almost complete	Complete
<i>Launch criteria</i>	Extremely limited	Limited	Fewer limits

^a low Earth orbit

^b geosynchronous Earth orbit

^c sensor capability

Adapted from Lt Col Edward B. Tomme, *The Paradigm Shift to Effects-Based Space: Near-Space as a Combat Space Effects Enabler*. Research Paper 2005-01 (Maxwell AFB, AL: Airpower Research Institute, College of Aerospace Doctrine Research and Education, Air University, 2005), 21–31.

Space forces provide many unique capabilities. Although their employment has some limitations which must be considered, their persistence, large field of view, and security will be shown to greatly aid achievement of numerous COIN operations goals. With a basic understanding of these capabilities and limitations of space forces, we next look at the specific ways they can help the fight against insurgencies.

Isolating the Battlespace

The enemy's freedom of action beyond our frontiers is one of the factors determining the duration of the conflict. Material support and the assurance of strong and continuing aid from abroad are essential to maintaining a high morale among those fighting in our interior.

—Roger Trinquier
Modern Warfare: A French View of Counterinsurgency

This 1964 quote from the renowned COIN author reveals that the insurgent tactic of getting outside assistance is not new. The challenge for the executor of COIN operations is to minimize support (in matériel and/or manpower) reaching

the rebels. Since the United States is often unable to attack this aid at its source, as these are usually in neighboring countries, we will examine an improved role for space forces in isolating the battlespace from outside intervention.

Requirements for Operations in Iraq

Before discussing the part space forces can play, we must first validate that current operations in Iraq actually require isolating the physical battlespace.²³ The NSVI statement that “terrorists and extremists from all parts of the Middle East and North Africa have found their way to Iraq” supports this requirement. Preventing this migration is paramount since it violates one of the strategies’ core assumptions that “regional meddling and infiltrations can be contained and/or neutralized.” The NSVI identifies sources of this meddling when it indicates that a key challenge is that “Iran and Syria have failed to provide support to Iraq’s new government and have in many ways actively undermined it.” Specifically, it states that these countries “provide comfort and/or support to terrorists and the enemies of democracy in Iraq” and neutralizing their actions is an ongoing challenge. Finally, the NSVI states the ultimate strategic objective will be achieved when “the government of Iraq . . . monitors and controls its borders.”²⁴ In order to overcome the previous challenges and achieve this objective, we can look for past attempts to isolate the physical battlespace in order to see how previous COIN efforts have attempted to accomplish it.

Historical Examples

The need to prevent outside support to insurgencies is a recurrent theme throughout history. During the Greek Civil War (1943–49), the Royal Hellenic Air Force (RHAf) used aircraft to try to prevent Yugoslavian supplies from reaching guerrilla forces. Although an American officer noted “the return from the air effort immeasurably exceeded the return from any comparable effort on the ground,” its results were still limited. While the RHAf was able to prevent daytime enemy movements, enemy supplies still moved at

night since the pilots' impaired vision limited surveillance.²⁵ While this illustrates the capability of overhead surveillance to limit support to insurgents, it shows a weakness in human sensors.

The French effort in Algeria during the 1950s and 1960s was one of the most successful instances (at least operationally) of isolating an area. There the French developed the Morice and Pedron lines to isolate Algerian insurgents from, respectively, Tunisian and Moroccan supplies.²⁶ Trinquier asserts that these lines were a success because the guerrillas were limited "in a large part because the border fence [did] not [permit] them to receive the supplies vital to the normal development of their activities."²⁷ In fact, utilizing aerial surveillance and reconnaissance (S&R) and strike, supported by ground and air mobile land forces, the French stopped 70 percent of the supplies from entering the country.²⁸ Although an overall success, Trinquier notes many difficulties. Specifically, "By day, the air force can ensure the effective surveillance of land and sea frontiers. At night, however, its role is much reduced." He observes that "guarding the frontiers on the ground is even more difficult to realize."²⁹ The French experience again shows that above-the-surface forces are more effective and efficient than ground forces in stopping enemy supplies, and human sensors are limited during night missions.

While aircraft proved effective in these incursions, there were other times when they were less successful. James Corum and Wray Johnson describe how, when the British attempted to deal with insurgents in the Malayan Emergency (a guerrilla war comprised of British, Commonwealth, and Malayan armed forces against the Malayan National Liberation Army), dense jungle limited aerial surveillance, preventing visual reconnaissance of guerrilla forces. Coincidentally, the aircraft's noise alerted infiltrating insurgents and allowed them to disperse prior to British forces' attacks. The authors also recount how in the Portuguese colonial wars of 1961–74, the enemy was able to field effective antiaircraft artillery and surface-to-air missiles. This allowed the insurgents to shoot down numerous Portuguese aircraft, forcing them to higher altitudes and limiting their ability to prevent enemy infiltration.³⁰ These experiences highlight the need

for a protected surveillance capability which can overcome the limits of terrain and minimize collateral effects.

The French and American involvement in Vietnam further substantiates these needs. Early on, the French utilized aircraft in an S&R role, but this proved highly ineffective as the Viet Minh became experts at hiding their supply movements. They used underground passages and camouflage, concealment, and deception (CCD) to limit detection.³¹ The American involvement highlighted similar aircraft limitations as the Viet Minh continued to use their successful tactics. In response, the Americans deployed the Igloo White network of remote sensors and surveillance systems.³² This network fed its data to aircraft, and finally to ground stations, which directed forces to interdict the targets. Although some military estimates claimed that Igloo White more than doubled the number of trucks destroyed, many dispute these numbers.³³ This system's effectiveness was partially curtailed by both the inability of friendly air forces to attack the located enemy units and the enemies' ability to deactivate or destroy the ground sensors.³⁴ These events continue to emphasize the requirement for a surveillance capability which can overcome terrain obstacles. They show that "the enemy gets a vote" and that actions taken to isolate the physical battlespace through surveillance will likely be countered.

Space Forces' Role

We have seen that the need to isolate the physical battlespace is not new and reviewed how this was previously attempted. Now, the role that space forces can fill in achieving this effect will be examined. The following highlights the capabilities space forces can provide in this area and then discusses some of their limitations.

Capabilities

In Iraq, the need to interdict forces or supplies from Syria or Iran can be aided by numerous surveillance platforms. The above historical examples show that above-the-surface sensors can be more effective (given the right terrain) and can see a much greater area than ground sensors. Addi-

tionally, they demonstrate how newer sensor technologies can provide greater surveillance throughout the wavelength spectrum, overcoming nighttime limitations.³⁵ Furthermore, in cases where terrain does not allow overhead platforms to see to the surface, unmanned ground sensors can augment air or space capabilities.

The preceding discussion has illustrated the proven value of above-the-ground platforms in various scenarios. Our attention now turns to how space forces can be optimally used. Given the need for a protected capability, a low-flying air platform should be ruled out since it is relatively easy for rebels to attack. Moreover, the requirement to prevent collateral effects pushes the altitude of any platform high enough so that it is not easily seen or heard from the ground. These constraints lead to envisioning two possible concepts. The first involves intermittent surveillance utilizing change detection to indicate insurgent traffic. This function—with the correct sensors—can be done with either high-altitude air or space forces. The second concept entails the detection of real-time enemy intrusions; this requires a platform with continuous coverage. In this type of operation, space forces would have the advantage since loiter times of near-space assets are vastly superior to those of air-breathing (including unmanned) systems. Furthermore, near-space platforms are planned to provide this long-term, constant coverage at a lower cost.³⁶

Limitations

Although providing sustainable effects more cheaply, space forces have some drawbacks while performing this mission. The first is the necessity to see small units (groups of people or single vehicles). This requires advanced sensors. However, since current LEO imagers can provide one-meter resolution, a similar sensor placed in near-space would achieve a resolution of 20 centimeters, which should be sufficient.³⁷ Of course, the greatest challenge any platform will need to overcome is defeating a reacting enemy. In doing this, a near-space platform's easier upgrade ability will make it very capable. However, this adaptability cannot be assumed to completely prevent outside interference. Even the highly successful French efforts in Algeria were only able to stop



70 percent of incoming supplies. Therefore, this should be seen as a step in aiding the counterinsurgency, buying more room for the legitimate government to operate, and not as a panacea to the entire insurgency problem.

The need to isolate the physical battlespace from outside interference is common to many insurgencies (including Iraq). Near-space assets' persistence, field of view, upgrade ability, security, and cost make them unique in their ability to perform this mission.

Attacking Fielded Forces

The essence of future asymmetric warfare is that adversaries will seek to offset our air intelligence, surveillance, reconnaissance, and other technological advances by fighting during periods of reduced visibility and in complex terrain and urban environments where they can gain sanctuary from US strikes.

—The Honorable Ike Skelton
*Whispers of Warriors:
Essays on the New Joint Era*

By definition, an insurgency is usually undertaken by a less well-armed force to attain its political ends. Since these rebels lack the armament to fight a traditional force-on-force battle, they seek to counter the more highly armed forces' capabilities by attacking where there are no government forces and in areas where it is difficult for them to respond, as noted above. Although the enemy chooses the time and place of their offensives, US forces must counter these in order to deplete the insurgents' manpower, supplies, and will and to provide the legitimate government time to enact appropriate changes to oppose the rebel cause. This section validates a role for space forces in attacking these fielded enemy forces.

Requirements for Operations in Iraq

Although implementing the preceding section's suggestions should help prevent some manpower and supplies from reaching the rebels, the current struggle in Iraq also

highlights the need to defeat those insurgents who are attacking, or have attacked, civilians or government forces. Based on one of the NSVI's core assumptions that the enemy does "not have the manpower or firepower to achieve a military victory over Coalition and Iraqi Security Forces," these strikes will likely be asymmetric. The NSVI also states that two enemy goals are to "damage trust in Iraqi Security Forces through . . . barbaric attacks on the weak and the innocent" and "sabotage Iraqi unity through . . . attacks intended to spark sectarian conflict and civil war." To counter these assumptions, it identifies the friendly task as holding "areas freed from enemy control by ensuring that they remain under the control of a peaceful Iraqi government." To do this, the United States must fight fielded forces by achieving its objective of developing "the Iraqis' capacity to secure their country while carrying out a campaign to defeat the terrorists and neutralize the insurgency."

The NSVI notes two major challenges in achieving the above goals. The first of these is "countering the intimidation and brutality of enemies whose tactics are not constrained by law or moral norms." Overcoming this challenge requires the ability to counter traditional terrorist tactics (such as bombings, etc.). The second challenge is that "the continued existence and influence of militias and armed groups . . . hamper[s] the rule of law in some parts of Iraq."³⁸ This requires COIN forces to defeat groups that engage in more traditional (but smaller-scale) combat, utilizing "complex terrain and urban environments" to inhibit COIN responses. Analyzing the past provides ideas for defeating these two groups.

Historical Examples

There are many accounts of past attempts to defeat fielded insurgent forces. One of the earliest modern examples of countering mobile guerrilla bands was the French COIN effort in Spain during the early 1800s. The French forces (like most conventional forces in these "limited" wars) were unable to employ the manpower required to guard all areas and respond to enemy strikes before the insurgents fled; therefore, they used mobile columns to attack the

rebels.³⁹ Manpower shortages also prevented the French from sweeping areas with forces sized to engage large guerrilla units. To overcome this disadvantage, they swarmed multiple columns on larger enemy forces. Although good in principle, this tactic proved ineffective in reality due to slow communications between friendly units and the guerrillas' ability to disrupt these links.⁴⁰

According to Corum and Johnson, the French experience highlights two major problems that forces have often encountered when attempting to attack rebel bands. First, since insurgents are often indistinguishable from the civilian populace, and/or are using CCD, the ability to identify them prior to an attack is limited. Government forces are, therefore, required to wait for, and respond after, attacks. Quickly identifying a strike and counterattacking before guerrillas dissolve into the population or terrain has also been a challenge. The second problem often faced is that the nonlinear nature of insurgencies requires friendly forces to disperse throughout the operations area to maintain sufficient coverage. Once an enemy force is identified, government forces must swarm multiple units upon the enemy to achieve effective mass. As the French found, difficulties in tracking, coordinating, and communicating with other friendly units have hampered COIN effectiveness.

Accounts of forces attempting to fight fielded rebel forces also exist. Corum and Johnson describe another such instance—the British colonial air control operations pursued between the two World Wars. The Royal Air Force (RAF) used aircraft to pursue and execute punitive attacks against fleeing guerrillas during its Middle Eastern operations. Although airpower's ability to attack in isolation was advertised as a critical capability, in reality the aircrafts' capacity to single-handedly defeat anything but the smallest rebellion is highly contested. Instead, finding and tracking fleeing insurgents proved to be the RAF's primary role. In these missions, the RAF exhibited how above-the-surface forces provide a more effective and less expensive reconnaissance capability for tracking fielded rebels than ground forces.

The French also attempted a program similar to the British air control in Morocco and Syria during the interwar years, but with lesser success, as the two authors further elaborate. One of the great limitations of French aircraft of

the time was their communications. Their reconnaissance aircraft used radios which could only connect with the rear headquarters and not frontline troops. This prevented them from providing important information and coordination to the troops who needed it most—those in contact with the enemy. The French also found that their aircraft were susceptible to Syrian surface fires and lost several during operations.⁴¹ These French operations underscore the importance of a protected communications capability which can both provide information to and coordination between forces tracking insurgents after they attack.

Another example of tracking fielded rebels is found in the Philippines during the Huk Rebellion (1946–56). During this COIN operation's early stages, communications problems again arose. In this case, Corum and Johnson relate that a lack of connectivity with headquarters led to aircraft receiving ground forces' messages and then flying back to base to relay them face-to-face. They further convey that these beginning efforts focused on planning for and attacking known guerrilla formations. These tactics were ineffective, as the insurgents either escaped or struck government forces prior to the planned assaults. According to the authors, the Philippine army learned from these early failures, and its later COIN efforts proved more successful. Ground forces overcame their radio limitations by using signals (farm gates, haystack arrangements, etc.), allowing commanders to transfer forces between sectors. In addition, instead of merely attacking fleeing insurgent groups, they used aircraft to track them to the new rebel bases. The insurgents were placed under constant surveillance to ensure enemy forces remained stationary until the offensive. By using these two tactics, the army was able to quickly swarm its forces and gain mass on the enemy encampments, making for a more efficient fight. In all, the above-the-surface asset's tracking and communications capabilities were a triumph in preventing the Huk rebels from massing and attacking later in the conflict.⁴²

The South African efforts in South-West Africa (now Namibia) are another example, given in *Airpower in Small Wars*, of using assets to track guerrillas and aid communications. It relates how government forces used aircraft to track and mark enemy units for ground-force engagement.

These operations showed one of the earliest successful uses of unmanned aerial vehicles (in addition to manned aircraft) to find and follow insurgent groups. Once found, reaction police forces were called in to swarm on the insurgents, providing the needed mass while aircraft communications aided battle coordination. In all, this book concludes, one of the great lessons from the South Africans' efforts was the importance of integrating all S&R and communications capabilities in support of ground forces.⁴³

Space Forces' Role

These historical examples provide instruction that can be applied to the requirement to attack fielded forces in the current struggle. We will now consider the capabilities, as well as the limitations, of space forces in this area.

Capabilities

The preceding examples support the need for a protected, integrated means to track guerrillas and provide S&R and communications to coordinate friendly-force actions. This capability would allow COIN forces to both disperse and mass, as required, to effectively respond to rebel actions. As mentioned, space forces can provide this more securely than aircraft. Furthermore, since the enemy will attack where friendly forces are not (or at least where they are not seen to be), only by maintaining persistent, unseen surveillance can COIN forces hope to observe insurgent groups' attacks, track them back to their larger formations, and counter them most efficiently. Therefore, space forces' "invisibility" and persistence are also critical.

Besides fighting armed groups, space forces can also help prevent terrorist activities. Military forces traditionally have had difficulty in countering these attacks due to challenges in attributing an explosion to the person who placed the bomb (since the insurgent is likely gone when it explodes). A system capable of watching an area and recording ongoing activities would allow friendly forces to "replay" events prior to a bomb's detonation, hopefully identifying those responsible. Based upon his experience fighting insurgents in Iraq, an Army commander identified this as one of three critical

capabilities that above-the-surface forces could provide.⁴⁴ Near-space assets' persistence and station-keeping ability should provide a first step towards this goal.

Finally, space forces provide unique capabilities in urban environments. Since space forces operate at higher altitudes, they maximize the viewable area. In general, tall buildings (or other tall ground structures) create a "shadow" that prevents sensors from viewing some activities. As a sensor moves to higher altitudes, this shadow area decreases, allowing space forces to provide observation capabilities greater than those of aircraft.

Limitations

Space forces are imperfect in supporting attacks on fielded rebel forces. First, discerning insurgents from the general population will likely require human identification, which will drive a need for numerous analysts to review data from space and near-space assets. Also, the lack of an operator on the platform will limit space forces' capability to perform onboard data processing. The downlinking of vast amounts of sensor information, in addition to the ground forces' communications links, will require using large portions of the frequency spectrum. Making this work will require detailed communications management to ensure the various feeds do not conflict.

Another flaw is driven by the need to provide capabilities over urban areas. As described, space forces can minimize the shadow effects of tall structures, but this requires an asset to be (nearly) directly overhead. Due to the laws of physics, orbiting objects can only continuously provide this capability for equatorial locations. In contrast, near-space platforms can be placed on top of any area of interest. However, the shadow effects will reduce each sensor's ability to view away from its subpoint, limiting the effective field of view of each asset. Therefore, to successfully survey a large urban area requires numerous platforms, each viewing a small section of the city. Although more platforms may be required, space forces should still be able to maintain their cost advantage due to their lower per-unit cost.

The importance of tracking insurgents and providing effective communications to COIN forces has been seen in

many operations and is critical to operations in Iraq. The ability of space forces to provide persistent, unimpeded, protected sensors and communications relay nodes will allow them to be a tremendous asset in this facet of COIN operations.

Support to the Government

The short-term response rests in defensive measures, but the long-term solution lies in development. Development cannot proceed while the insurgency is bleeding the country of its human and financial resources.

—Dr. Thomas A. Marks
“Counterinsurgency and Operational Art”
Low Intensity Conflict and Law Enforcement, Winter 2005

We have discussed efforts to counter symptoms of the insurgency (external support and rebel attacks). However, in order to effectively defeat the rebellion, COIN forces must not only attack these symptoms but also address the insurrection's root causes. Accomplishing this requires not only buying time through defensive measures but also executing operations to reinforce and maintain the government so it is strong enough to resolve the rebel's grievances.

Requirements for Operations in Iraq

As with any counterinsurgency, current operations in Iraq highlight the importance of supporting the established government. The first of three support avenues we examine is countering the enemy's line of action of using “the media to spread propaganda and intimidate adversaries.”⁴⁵ One of the tasks to thwart this is to “counter false propaganda.”⁴⁶ Additionally, one of the NSVI's eight strategic pillars is to “strengthen public understanding of coalition efforts and public isolation of the insurgents.” The United States looks to accomplish this by providing “technical assistance and training” to facilitate the Iraqi government's communications with its people. From this, one can see that the NSVI views information operations as key to winning in Iraq.

Another line of enemy action the *NSVI* specifies is “sabotaging key essential services.” A critical task to counter this action is protecting “key communication and infrastructure nodes.” This is significant because “infrastructure protection helps ensure that the Iraqi government can collect revenues and provide basic services to the people, which is critical to building confidence in the government and weaning support away from insurgents.”⁴⁷ This is so vital that two of the *NSVI*’s metrics to measure success are “electricity generated and delivered” and “barrels of oil produced and exported.” Furthermore, five of the *NSVI*’s eight strategic pillars involve the Iraqi infrastructure. Finally, the *NSVI* sees preventing “attacks against vital infrastructure, especially electricity and oil related nodes,” as the key challenge to be overcome in this area.

In addition to the above, the *NSVI* also recognizes the value of improving the economy in the new Iraq. One of the key tasks there is to “build the capacity of Iraqi institutions to maintain infrastructure . . . and improve the general welfare of all Iraqis.” To accomplish this, the *NSVI* acknowledges the challenge of an Iraqi economy that is “still shackled with many vestiges of a highly centralized economy and stagnant and corrupt institutions” and that must “creat[e] new institutions and [reform] old ones.” To succeed, it calls for “supporting the revitalization of agriculture and other productive sectors to diversify a single-resource-based economy.”⁴⁸

Historical Examples

History provides numerous examples of the criticality of supporting the government with COIN operations. One of these is the previously mentioned Huk Rebellion in the Philippines. According to Corum and Johnson, the United States realized that the breakdown of the traditional agricultural pattern was one of the insurrection’s main causes. To counter this, the National Security Council’s response emphasized the importance of economic reform rather than purely military solutions. This allowed the US effort to focus on the key center of gravity, the civilian population (not the Huk leadership). The authors further maintain that military aircraft played a crucial role in communicat-

ing these economic reforms through information operations that dropped leaflets and broadcast messages through megaphones and loudspeakers. These efforts highlight the importance of integrating a nation's instruments of power (IOP) in counterinsurgency. They also illustrate that military COIN operations are often more successful when they are more subordinate to the political process.⁴⁹

The British experience in Malaya also illustrates the importance of support to the government. Corum and Johnson's portrayal of this encounter reveals that British doctrine clearly emphasized the value of military support to civil authorities. In fighting the communist rebels, the British executed the Briggs Plan, which acknowledged the importance of civil organizations in pursuing an integrated civil-military strategy. To accomplish this, the RAF performed aerial psychological operations to help deny legitimacy to the insurgents—the plan's chief tenet. A British general emphasized the impact of these operations, saying that the "military effort is inextricably entangled with the political and psychological."⁵⁰ In all, military operations in Malaya proved effective in buying time for the legitimate political process to work, creating a democratic country—the ultimate strategic goal.

Space Forces' Role

We have seen how the need to provide support to the government continues into modern conflicts. As in the other areas examined, lessons from past conflicts help to illuminate the part space forces can fulfill in bridging some of the gaps that have existed. Capabilities and limitations of space forces in this capacity are described next.

Capabilities

Space forces can provide critical capabilities on all three lines of action in Iraq (which are likely to be found in future insurgencies as well). With regard to information operations, satellite communications can provide an effective way to relay messages to large audiences. Furthermore, for transmission to smaller audiences, or for more temporary effects, near-space assets can be used at a much lower cost.

Although lacking the ability to send auditory messages via megaphones and/or loudspeakers, space forces provide a more secure capability than aircraft. In addition to transmitting messages, space forces can also counter enemy information campaigns. Blocking enemy forces' electronic message transmission can be done by either jamming or identifying transmission sites for attack by other forces.

Space forces can also provide a critical capability in protecting the nation's infrastructure (specifically, lines of communications [LOC]). T. E. Lawrence's exploits in Arabia highlighted the importance of maintaining these LOCs and the insurmountable costs of attempting to use surface forces to protect them.⁵¹ Space forces' persistence and field of view provide a more effective means of protecting LOCs than surface forces, at a much lower cost. To illustrate, near-space assets could be used to maintain continuous lookout for vehicles or people that stop along LOCs. This information could then be transmitted to convoys traversing these areas, highlighting possible threats. Similarly, for power lines or pipelines, near-space sensors can be used to identify possible break points, speeding repair responses.

Finally, space forces can aid the government's ability to revitalize the economy. The first way they can help to do this is through satellite communications, since this will be critical to opening up the formerly centrally controlled economy of Iraq. Additionally, space assets (e.g., Landsat 7) can provide land-coverage data critical to assisting agricultural production.⁵² This data can help the Iraqi government's decision making, improving the transition to a non-single-source economy. Furthermore, as evidenced by the Huk Rebellion, this need for land reform is common to many insurgencies, and, therefore, this role should not be unique to Iraq.

Limitations

Although having the above capabilities, space forces cannot perform these missions in isolation. With regard to information campaigns, the success of operations by space forces is tied to the message. Compelling enemy messages will make it to the populace somehow. Even if the transmission of such messages is blocked, the enemy can find

alternate ways of getting that communications out (e.g., word-of-mouth). Similarly, if friendly force messages do not resonate with the people, they will likely be unsuccessful no matter how many ways they are transmitted.

Likewise, space forces can only help protect the infrastructure; they cannot singularly prevent attacks on LOCs.⁵³ Although they can warn friendly forces of areas that may have bombs emplaced or indications of ambushes, close-in forces will still need to determine if changes to the terrain are, for instance, actual threats or just broken-down vehicles. Finally, space forces cannot repair the infrastructure but only help speed repairs by identifying areas needing work.

Economic reform is yet another area in which space forces cannot succeed in isolation. For instance, space assets can only provide data to facilitate agricultural advancement. Local governments may not avail themselves of this information to improve the financial well-being of their citizens. Space technology not exercised will do little to counter the insurgents' cause.

Space forces can perform critical functions to help maintain the legitimate government. Although only acting in support, they can aid in addressing the rebel's cause through information operations, along with protecting the nation's infrastructure and improving its economy. Through these actions, space forces can be a critical enabler, allowing the government to improve conditions for citizens, countering the grounds for the insurrection, and, hopefully, ending the insurgency's existence.

Recommendations

Pieces of this operation that were successful wouldn't have been without space-based assets.

—Gen Tommy Franks,
Commander, US Central Command
“Space Integrates Air Forces to Win Wars”

We have seen the critical roles that space forces can play in COIN operations. These forces' persistence, security, and field of view generate effects not available, or available only at a greater cost, with air or ground forces. Given limited defense budgets and manpower, the military needs to focus on

areas where it can maximize its capabilities. To assist this process, recommendations are offered on specific ways to integrate space forces to better prosecute COIN operations.

As noted, isolating the battlespace was crucial to past COIN operations, is important in Iraq, and will likely be important in the future as well. The capabilities of space assets in performing this function have also been shown. Given this, the assumption would be that the US military is pursuing this application. This supposition is at least partially correct, as the DOD is developing near-space assets with generic S&R capabilities.⁵⁴ However, although these assets are intended to be used across the range of operations, the DOD's focus is currently on their application in supporting major combat operations.⁵⁵ The use of space resources in COIN missions has yet to be highlighted as a unique capability. To effectively perform these functions, appropriate tactics, techniques, and procedures must be developed. Therefore, the author recommends that the US military follow the mandate of DODD 3000.05 and integrate these assets into architectures to perform the "core US military mission" of stability operations, including COIN, as soon as possible.⁵⁶

Although near-space sensors can work well in unobstructed terrain, their capabilities in some environments (e.g., dense foliage) can be limited. Hence, the US military should be pursuing ground sensors to aid these platforms. The USAF was acquiring such a sensor in the Advanced Remote Ground Unattended Sensor (ARGUS) system. The ARGUS was a "critical" program intended to act in a system of systems to detect, identify, and report on activity through satellite communications in order to cue space-based sensors.⁵⁷ Unfortunately, this program was cancelled, and its associated \$13 million in funding for fiscal year 2006 was zeroed to support unspecified "higher priority requirements."⁵⁸ Given the NSVTs concern with preventing outside intervention in Iraq and the likelihood of similar requirements in future COIN operations, this program (or something similar) should be pursued to support this mission. In short, the development of ground sensors should be a main thrust of future acquisition and operations because of the recurring necessity to isolate the battlespace in COIN operations and the potential capabilities of space forces in this area.

As demonstrated, space forces can also prove crucial to defeating fielded forces; nevertheless, most current operations count on aircraft providing S&R and communications. This is possibly because many argue that it is essential to use aircraft in these missions to achieve the secondary effects of scaring insurgents and reassuring the public. These arguments are in error—numerous historical instances show that when airpower was used against a determined enemy, instead of causing fear, it often strengthened the enemies' will to resist.⁵⁹ Furthermore, aircraft negatively affect a nation's inhabitants. This was revealed in a May 2005 poll of Iraqi civilians, where 63 percent had bad feelings when they saw or heard an aircraft overhead.⁶⁰ These feelings were mostly due to the fear and insecurity the aircraft generated.⁶¹ The lack of positive, as well as the negative, effects that aircraft generate indicates that space forces are better suited for these missions. Consequently, the author recommends that space forces, with sensor and communications capabilities necessary to support attacking fielded forces, be developed, acquired, and employed.

Finally, we saw that space forces can provide many unique capabilities to support the legitimate government, thus helping it to enact changes to remove the insurrection's root cause. Of significance is that some of these capabilities (e.g., agricultural remote-sensing) are not provided via military platforms but rather by civil or commercial satellites. Although this is the case, only a military member will likely have knowledge of the full range of military capabilities and understand how best to incorporate them in the overarching effort. Given the importance of integrating capabilities across all of the IOPs, there should be a "space smart" military person on the highest level staffs, both military and civilian. This need was realized in Iraq, and on 6 February 2006 a space weapons officer was placed on the Multinational Force-Iraq staff.⁶² Although placing this officer is an important first step, it is the recommendation of this paper that in the future a space staff officer be authorized much earlier in stability operations to ensure effective integration of space forces.

A space integrator is also critical to the COIN mission due to the transferability of space forces. Since these US operations are supporting a foreign government, any solutions offered

must be able to be handed over to the legitimate government upon the exit of US forces to prevent the government from failing soon thereafter. Since the costs of aircraft have historically prevented insurgent-prone governments from using aircraft, space forces may be used as a cheaper alternative.⁶³ Therefore, assuming the USAF continues to execute foreign internal defense to train foreign forces on the use of aircraft, similar training on space and near-space assets should also occur. Training foreign militaries and/or placing space liaisons on their staffs may be even more vital for proper integration and transition of space forces, as many nations have less experience with space than air assets.

Given the critical support that space forces can provide to COIN operations, the above recommendations should be put into practice. Costs due to the changes required in acquisition, operations, and manning will likely be small compared to the resultant improvements in US performance in Iraq and other future COIN operations.

Conclusion

There's always a temptation, in the middle of a long struggle, to seek the quiet life, to escape the duties and problems of the world, and to hope the enemy grows weary of fanaticism and tired of murder. This would be a pleasant world, but it's not the world we live in. The enemy is never tired, never sated, never content with yesterday's brutality. This enemy considers every retreat of the civilized world as an invitation to greater violence.

—Pres. George W. Bush
National Strategy for Victory in Iraq

Counterinsurgencies have never been quick and easy. This has been especially true for militaries, like that of the current United States, which have excelled at large-scale combat operations. The shift to fighting rebels will require changes in procurement, operations, and organization. The US military has been directed to make these changes in order to fight this “long struggle.”

The goal of this paper was to show that the US military can employ space forces to help defeat an insurgency. Based upon current US needs in Iraq and the historical

examples discussed, it is evident that the basic nature of insurrections has included recurring trends over the years. Throughout history there has been a continuous requirement for counterinsurgency operations to isolate the battle-space, defeat fielded forces, and provide support to legitimate governments. The persistence, security, and field of view of space forces allow them to generate critical effects in fulfilling these three needs. Thus, their employment is crucial to future US counterinsurgency operations. Recommendations for acquisition, operations, and manning were also presented in this paper for the more effective use of space forces in a counterinsurgency role. It is the author's hope that these recommendations will be enacted. These types of battles are likely in the future and are far too important for the United States to lose.

Notes

(All notes appear in shortened form. For full details, see the appropriate entry in the bibliography.)

1. Since the NSS was published in September 2002 (soon after 11 September 2001 and the initiation of Operation Enduring Freedom), it is fair to state the most important threat in the war on terrorism at the time was al-Qaeda (validated by the fact that it is the only organization the NSS calls out by name [Bush, *National Security Strategy*, 5]). Furthermore, there is ongoing debate that al-Qaeda is, in fact, an insurgent and not a terrorist organization (Morris, "Al-Qaeda As Insurgency," 1-36). Finally, Bush notes that "Iraq is the central front in the global war on terror" (National Security Council, *National Strategy for Victory in Iraq*, 1). Therefore, any calls to fight terrorism are also calls to fight the insurgency in Iraq. Given this, national policy documents' references to terrorism and terrorists are assumed to apply to insurgency and insurgents as well.
2. Bush, *National Security Strategy*, i.
3. Ibid., i, 6.
4. Rumsfeld, *National Defense Strategy*, 3, 14-15.
5. DODD 3000.05, *Military Support for Stability*, 2.
6. As noted in Joint Publication (JP) 1-02, *Department of Defense Dictionary*, 264, an insurgency is "an organized movement aimed at the overthrow of a constituted government through use of subversion and armed conflict." Inherently preventing the overthrow of the government is a task required to "establish or maintain order."
7. Rumsfeld, *National Defense Strategy*, 12, 14-16.
8. National Security Council, *National Strategy for Victory in Iraq*, 1-2.
9. JP 1-02, *Department of Defense Dictionary*, 493.
10. AFDD 2-2, *Space Operations*, 7, 54.
11. This paradigm was proposed in Tomme, *Paradigm Shift*, 2. It is best summarized by AFDD 2-2, *Space Operations*, which notes that "in

terms of planning and executing forces, commanders are concerned with achieving effects, not whether those effects come from an air asset, space asset, information asset, or a combination of the three.” Therefore, one should conglomerate space capabilities around the effect(s) they provide, not the medium they operate in. Although the author of this paper agrees in principle, discussions of air assets’ role in COIN have been previously accomplished (for a thorough historical discussion, reference Corum and Johnson, *Airpower in Small Wars*), so this paper will not include them in its definition of space forces.

12. Tomme, *Paradigm Shift*, 1; and Volz, “Operating Concept,” 1. It is important to note that the term *near space* is fairly new and may have been chosen for political reasons (which are intentionally not discussed here). According to a highly placed civilian in the Department of the Air Force, this term may be losing favor and could be replaced in the near future; however, lacking better terminology it will be used here.

13. AFDD 2-2, *Space Operations*, 8-14.

14. Volz, “Operating Concept,” 1.

15. Ibid., 3, 20, 23.

16. Ibid., 5.

17. “Broadband Net Goes Stratospheric.”

18. “Cuts to High Altitude Airship.”

19. Volz, “Operating Concept,” 3.

20. Although the basic format for the table is taken from Tomme, *Paradigm Shift*, 26, the table presented here is an expansion of that provided in the original. Specifically, much of the information provided here is a summary of the discussion contained in Tomme, 21-31. Furthermore, some cells include calculations derived from Wertz and Larson, *Space Mission Analysis*, *passim*.

21. Tomme, *Paradigm Shift*, 15.

22. Ibid.

23. JP 1-02, *Department of Defense Dictionary*, 64, notes that battlespace is “the environment, factors, and conditions that must be understood to successfully apply combat power, protect the force, or complete the mission. This includes the air, land, sea, space, and the included enemy and friendly forces; facilities; weather; terrain; the electromagnetic spectrum; and the information environment within the operational areas and areas of interest.” Although space forces can play a role in isolating the electromagnetic and information environments, this discussion will be dealt with later. Therefore, this section focuses on the physical battlespace (i.e., air, land, sea, space, and the included enemy and friendly forces; facilities; and terrain).

24. National Security Council, *National Strategy for Victory in Iraq*, 7, 10, 18, 21, 29.

25. Corum and Johnson, *Airpower in Small Wars*, 105, 110.

26. Dean, “France-Algerian War,” 20.

27. Trinquier, *Modern Warfare*, 100.

28. Corum and Johnson, *Airpower in Small Wars*, 174.

29. Trinquier, *Modern Warfare*, 99-100.

30. Corum and Johnson, *Airpower in Small Wars*, 194, 291.

31. Ibid., 150.

32. Rosenau, *Special Operations Forces*, 11.
33. Ibid., 13.
34. Ibid., 14.
35. As an example, a hyperspectral sensor could identify camouflaging which would be impossible with the human eye.
36. Lower cost is based on two assumptions. The first is either two Global Hawks or two station-keeping, near-space platforms, each providing continuous coverage (one in operations and one in recovery/maintenance/launch preparation). The second is similar operations and maintenance (O&M) costs for both. This is a debatable assumption since O&M costs for near-space assets are mainly conjecture at this time—actual costs have yet to be determined. If amounts are verified, then unit acquisition costs can be used as the sole basis for cost comparison. Two Global Hawks would cost \$96 million versus two near-space platforms at \$2 million. Furthermore, in *Paradigm Shift* (46), Tomme notes simulations of actual weather patterns during the opening days of Operation Iraqi Freedom validated that launching six cheaper, free-floater, near-space systems (\$1,000–\$3,000 per asset plus sensor cost) daily could cover all of Iraq.
37. Bjorgo, "Space Aid."
38. National Security Council, *National Strategy for Victory in Iraq*, 7–8, 11, 18, 21.
39. Alexander, "French Military Problems," 183.
40. Ibid., 185.
41. Corum and Johnson, *Airpower in Small Wars*, 58, 61, 76, 79, 81, 150.
42. Ibid., 123, 128, 130–31.
43. Ibid., 306, 311–13.
44. Briefing, anonymous, subject: Learning to Eat Soup.
45. National Security Council, *National Strategy for Victory in Iraq*, 7.
46. Ibid., 8.
47. Ibid., 19.
48. Ibid., 7, 9, 11, 13, 18–19, 24, 26, 28–32, 35.
49. Corum and Johnson, *Airpower in Small Wars*, 119–20, 131, 135.
50. Ibid., 182, 189, 191, 194, 198, 214.
51. Lawrence, *Seven Pillars of Wisdom*.
52. Bjorgo, "Space Aid."
53. Although, in theory, if future space forces could track and strike these rebels, they could prevent attacks on LOCs. It is unlikely this capability will exist for the foreseeable future, and, therefore, it is not pursued in this document.
54. Tomme, *Paradigm Shift*, 47.
55. Volz, "Operating Concept," 22–23.
56. DODD 3000.05, *Military Support for Stability*, 2.
57. Kok, "ARGUS Award."
58. Exhibit R-2, "RDT&E Budget Item."
59. Corum and Johnson, *Airpower in Small Wars*, 84.
60. Briefing, Read, subject: Five Propositions, 42.
61. Ibid., 44.
62. Assayag to the author, e-mail.
63. Corum and Johnson, *Airpower in Small Wars*, 290.



Abbreviations

AFDD	Air Force doctrine document
ARGUS	advanced remote ground unattended sensor
C2	command and control
CCD	camouflage, concealment, and deception
COIN	counterinsurgency
DOD	Department of Defense
DODD	Department of Defense directive
GEO	geosynchronous Earth orbit
IOP	instrument of power
ISR	intelligence, surveillance, and reconnaissance
JFC	joint force commander
JP	joint publication
JWS	Joint Warfighting Space
LEO	low Earth orbit
LOC	line of communications
NDS	<i>National Defense Strategy</i>
NSS	<i>National Security Strategy</i>
NSVI	<i>National Strategy for Victory in Iraq</i>
O&M	operations and maintenance
RAF	Royal Air Force
RHAF	Royal Hellenic Air Force
S&R	surveillance and reconnaissance
SC	sensor capability





Glossary

(For full citations of referenced documents, see the bibliography of this paper.)

battlespace. The environment, factors, and conditions that must be understood to successfully apply combat power, protect the force, or complete the mission. This includes the air, land, sea, space, and the included enemy and friendly forces; facilities; weather; terrain; the electromagnetic spectrum; and the information environment within the operational areas and areas of interest. (JP 1-02)

effect. A change to a condition, behavior, or degree of freedom. (JP 1-02) The tactical, operational, and strategic level outcomes that a military action produces. (AFDD 2-2)

near-space. Area above the earth from ~65,000 to 325,000 feet altitude, sub-orbital. (Volz, "Operating Concept.")

space forces. The space and terrestrial systems, equipment, facilities, organizations, and personnel necessary to access, use and, if directed, control space for national security. (JP 1-02)

space system. A system with a major functional component that operates in the space environment or which, by convention, is so designated. It usually includes a space element, a link element, and a terrestrial element. In addition, a space system may also consist of components that travel between space nodes, space to ground, ground to space, or ground to ground through space. (AFDD 2-2) For the purposes of this paper, space systems include assets (and required support) which generate space effects operating in either traditional space (above the atmosphere, subject to the laws of orbital mechanics) or near space.





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